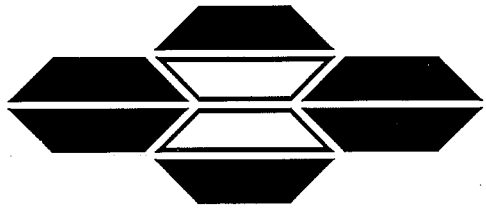

ASBESTOS TEM LABORATORIES, INC.

NIOSH 9002 Method
Polarized Light Microscopy

Final Report

Laboratory Job #: 741-00021

1409 Fifth Street, Suite C
Berkeley, CA 94710
(510) 528-0108 Phone
(510) 528-0109 Fax
www.asbestostemlabs.com

ASBESTOS TEM LABORATORIES,
INC.

Accredited by
U.S. Dept. of Commerce
NVLAP
CA DOHS ELAP

Mar-09-05

Mr. Howard Edwards
Ecology and Environment, Inc.
350 Sansome Street, Suite 300
San Francisco, CA 94104

Re: LABORATORY JOB # 741-00021
2 Polarized light microscopy analytical results for bulk sample(s).
Job Site: El Dorado Hills

Enclosed please find the bulk material analytical results for two samples submitted for asbestos analysis. The analyses were Performed in accordance with NIOSH 9002 for the determination of asbestos content of bulk materials by polarized light microscopy (PLM). Please note that while PLM analysis is commonly performed on bulk samples, it needs to be aware that PLM is subject to limitations. In these situations, accurate results may only be obtainable through the use of more sophisticated and accurate techniques such as transmission electron microscopy (TEM) or X-ray diffraction (XRD).

Prior to analysis, samples are logged-in and all data pertinent to the sample recorded. The samples are checked for damage or disruption of any chain-of-custody seals. A unique laboratory ID number is assigned to each sample. A hard copy log-in sheet containing all pertinent information concerning the sample is generated. This and all other relevant paper work are kept with the sample throughout the analytical procedures to assure proper analysis.

Each sample is opened in a class 100 HEPA negative air hood and analyzed following the NIOSH 9002 method. The analytical data is then compiled into standard report format and subjected to a thorough quality assurance check before the information is released to the client.

Sincerely Yours,

Yanxia Xie
Lab Manager
ASBESTOS TEM LABORATORIES, INC.

--- These results relate only to the samples tested and must not be reproduced, except in full, with the approval of the laboratory. This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government. ---

ASBESTOS TEM LABORATORIES, INC.

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Polarized Light Microscopy
Analytical Report

Client Sample ID	Lab Sample ID	Description	Analysis Method	% Chrysotile Asbestos	% amphibole asbestos	% Fiberous non-asbestos	% non-fiberous non-asbestos	Detection Limit	Analyst Initials	Analysis Date	QC	
											Analyst Initials	Date
EDH-ZP2-022305	741-00021-001	Soil - Brown	NIOSH 9002	1-5% (3%)	1-5% (2%) Tremolite	<1%	90-98% (95%)	1%	SK	03/04/2005	DV	03/04/2004
EDH-ZP2-022305	741-00021-002	Soil - Brown	NIOSH 9002	5-10% (8%)	5-10% (6%) Tremolite	0	80-90% (86%)	1%	SK	03/04/2005	DV	03/04/2005

Lab QC Reviewer: _____

Analyst: _____

1409 FIFTH STREET, SUITE C • BERKELEY, CA 94710 • (510) 528-0108 • FAX (510) 528-0109

ASBESTOS TEM LABORATORIES, INC.

PLM BULK SAMPLE LOGIN REPORT

LOG#: 048659

INVOICE #: 70032

ANALYSIS REQUESTED: **PLM-STANDARD** URGENCY: **6-10 DAYS**

DATE / **Feb-24-05**
TIME IN: **10:15 am**

CLIENT NO: **741** LOT NO: **00021** Total Samples: **2**

DATE / **Mar-10-05**
TIME DUE:

JOB SITE: **El Dorado Hills**

JOB NO:

Logged by: **ry** CONTACT: **Mr. Howard Edwards**

SAMPLE CONDITIONS: **EXCELLENT** DELIVERED BY: **FedEx S**

SPECIAL INSTRUCTIONS

☒ **FAX** 415-981-0801 ☒ ~~E-MAIL~~ hedwards@ene.com
See marketing screen for more info!!!

Invoice To: ~~LJohnson@ene.com~~

REVIEWED VX E-MAILED Mailed

CL#-LOT-SAMP	CLIENT#	DESCRIPTION
741-00021-001	EDH-ZP2-022305	
741-00021-002	EDH-ZP3-022305	

POLARIZED LIGHT MICROSCOPY: DATA SHEET

ASBESTOS TEM LABORATORIES

Lab I.D. #: 741-21-1 Job Site: EL DORADO HILL

Client I.D. #: EDH-ZP2-022305 Location:

Description: Color: BEIGE

MACROSCOPIC PROPERTIES:

Homogeneity: Low ☐ Mod. ☑ High ☐

Friable: ☑ Non-friable: ☐

Texture: Powdery

Macroscopic est. of % asbestos: 5-10%

Optical Properties Of Fibrous Constituents:

Morphology	Color	Pleochroism	Ref. Index Perp./Parall.	Birefr.	Ext. Angle	Sign of Elong.	Other Properties	%	Non-Asbestos	%	Asbestos
Wavy fibers and bundles with splayed ends. A.Ratio 10-1	clear	None	γ = 1.554 α = 1.548	L	P	+	Dis. Stain. Color γ = Blue α = Red-purple			1-5 (3)	Chrysotile
Straight blades and needles	clear	None	γ = 1.627 α = 1.619	H	I 0-10°	+	D.S.C γ = Blue/Orange α = Yellow			1-5 (2)	Tremolite

Non-fibrous material I.D.: Quartz, Opaque, Other m.p.

Comments:

5-10	% ASBESTOS
	% NON-ASBESTOS, FIBROUS
90-95	% NON-FIBROUS

Signature:

Date: 03/04/05

h:\excel\datashts\plmdata.xls

POLARIZED LIGHT MICROSCOPY: DATA SHEET

ASBESTOS TEM LABORATORIES

Lab I.D. #: 741-21-2 Job Site: El DORADO HILLS

Client I.D. #: EDH-ZP3-022305 Location:

Description: Color: Beige

MACROSCOPIC PROPERTIES:

Homogeneity: Low ☐ Mod. ☑ High ☐

Friable: ☑ Non-friable: ☐

Texture: Powdery

Macroscopic est. of % asbestos: 10-20%

Optical Properties Of Fibrous Constituents:

Morphology	Color	Pleochroism	Ref. Index Perp./Parall.	Birefr.	Ext. Angle	Sign of Elong.	Other Properties	%	Non-Asbestos	%	Asbestos
Wavy fibers and bundles	clear	None	γ = 1.554 α = 1.548	L	P	+	D.S.C γ = blue α = red purple			5-10 (8)	Chrysotile
Straight fibers and needles	Clear	None	γ = 1.627 α = 1.619	H	I to	+	D.S.C γ = Blue, Orange α = Yellow			5-10 (6)	Tremolite

Non-fibrous material I.D.: Quartz, opaque, Other m.p.

Comments:

10-20	% ASBESTOS
	% NON-ASBESTOS, FIBROUS
80-90	% NON-FIBROUS

Signature:

Date: 03/04/05

POLARIZED LIGHT MICROSCOPY: DATA SHEET

ASBESTOS TEM LABORATORIES

MACROSCOPIC PROPERTIES:

Homogeneity: Low ☐ Mod. ☑ High ☐

Friable: ☑ Non-friable: ☐

Lab I.D. #: 741-21-1 Job Site: El Dorado Hills

Client I.D. #: EDH-ZPZ-012305 Location:

Texture: Powdery - Grainy

Description: Composite material Color: Beige

Macroscopic est. of % asbestos:

Optical Properties Of Fibrous Constituents:

Morphology	Color	Pleochroism	Ref. Index Perp./Parall.	Birefr.	Ext. Angle	Sign of Elong.	Other Properties	%	Non-Asbestos	%	Asbestos
wavy fibers	colorless	None	n∥β: 1.554 n⊥α: 1.549	Mod	//	+				1-5% 3%	chrysotile
needles straight thin fibers	pink to colorless	None	n∥β: 1.637 n⊥α: 1.618	M	oblique 1-10%	+				1-5% 2%	Tremolite

Non-fibrous material I.D.: Qtz, Misc. frags, Amph, Opq

Comments:

2-10%	% ASBESTOS
	% NON-ASBESTOS, FIBROUS
90-98%	% NON-FIBROUS

Signature: Roger Wagner C

Date: 3-04-05

POLARIZED LIGHT MICROSCOPY: DATA SHEET

ASBESTOS TEM LABORATORIES

Lab I.D. #: 741-21-2 Job Site: El Dorado Hills

Client I.D. #: EDH-EPA-022305 Location:

Description: composite Color: Beige

MACROSCOPIC PROPERTIES:

Homogeneity: Low ☐ Mod. ☑ High ☐

Friable: ☑ Non-friable: ☐

Texture: grainy - powd

Macroscopic est. of % asbestos:

Optical Properties Of Fibrous Constituents:

Morphology	Color	Pleochroism	Ref. Index Perp./Parall.	Birefr.	Ext. Angle	Sign of Elong.	Other Properties	%	Non-Asbestos	%	Asbestos
wavy fibers bundles	colorless	None	n11: 1554 n⊥: 1,549	M	//	+				5-10 8%	chrysotile
needles straight thin fibers	colorless	None	n11: 1,627 n⊥: 1,618	M	oblique 0-11°	+				5-10% 8%	Tremolite

Non-fibrous material I.D.: Misc. frags, Qtz, Ofg, Amph

Comments:

10-20%	% ASBESTOS
	% NON-ASBESTOS, FIBROUS
80-90%	% NON-FIBROUS

Signature: Diego Vasquez C

Date: 3-4-05

h:\excel\datashts\plmdata.xls

ASBESTOS TEM LABORATORIES, INC.

1409 Fifth Street, Suite C
Berkeley, California 94710
(510) 528-0108 Phone
(510) 528-0109 Fax

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Accredited by
U.S. Dept. of Commerce
NVLAP
CA DOHS ELAP

Attachments

1. Client COC form
2. Laboratory Sample Login Sheet
3. Analyst Raw Data Sheets
4. QC Analyst Raw Data Sheets

ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement

REGION 9
75 Hawthorne Street
San Francisco, California 94105

CHAIN OF CUSTODY RECORD

PROJ. NO.:

PROJECT NAME: El Dorado Hills

SAMPLERS: (Signature) [signature] Howard Edwards

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CON-TAINERS	Asbestos by PLM	Asbestos by TEM					REMARKS
	02/23/05	1345		✓	EDH-ZP2-022305	1	✓	✓					Analysis performed per
	02/23/05	1400		✓	EDH-ZP3-022305	1	✓	✓					Scope of work

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Howard J Edwards [signature]	2/23/05 1421				
	2/24/05 10:15AM	ATEM/[signature]			

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

9 28915

ecology and environment, inc.
350 SANSOME STREET, SUITE 300, SAN FRANCISCO, CALIFORNIA 94104, TEL. (415) 981-2811
International Specialists in the Environment

SCOPE OF WORK
Region IX START

El Dorado Hills Naturally Occurring Asbestos Project

Performance Evaluation Soil Analysis by PLM and TEM

PAN: 001275.0440.01TA
TDD Number: 09-04-0-0011

1.0 GENERAL

Ecology and Environment, Inc., (E & E), with a business office located at 350 Sansome Street, Suite 300, San Francisco, California 94104, has entered into a contract (Contract No. 68-W-01-012) with the U.S. Environmental Protection Agency (US EPA) to procure as needed various analytical services.

The US EPA has directed E & E to analyze two soil performance evaluation (PE) samples. The performance evaluation samples were developed by a contractor for the US EPA Region 9 Quality Assurance Office.

2.0 ANALYTICAL REQUIREMENT

2.1 PURPOSE OF ANALYSIS

E & E will submit the (PE) samples for analysis . The specific analysis parameters required are indicated in sections 2.2, 2.3, 2.4, 3.0 and 4.0. The data will be used by the US EPA as part of a PE study of asbestos in soil.

2.2 SPECIFIC PROJECT REQUIREMENTS

All laboratory services will be provided by the E & E contracted laboratory with no sub-contracting of analyses allowed. Air samples will be initially analyzed for asbestos fibers following NIOSH 9002, *Asbestos by Polarized Light Microscopy.* If asbestos is not detected

sample at a concentration of greater or equal to 1 percent by area following NIOSH 9002, then the sample will be further analyzed by Transmission Electron Microscopy following *EPA 600/R-93/116, Method for the Determination of Asbestos in Bulk Building Materials Method.*

Specific project requirements and specifications for the method are listed in Table 2-1, Table 2-2 and Table 2-3. Other required specification are described in sections 3 through 5 of this SOW

To insure quality for the analytical project the following measures are required:

- All analyses will be conducted by a NVLAP-certified laboratory for the analysis of asbestos fibers.
- The laboratory must provide documentation of successful proficiency in detection of "Libby amphibole" asbestos.
- The laboratory must conduct zone axis patterns measurement and quantitative EDS chemistries for identification.
- The laboratory will have previous experience in the determination of chrysotile, regulated amphibole asbestos fibers in soil by the specified NIOSH and EPA methodologies.
- The laboratory will have previous experience in the determination and reporting of non-regulated amphibole by PLM and TEM.
- The laboratory will have previous experience with providing detailed analytical documentation of analysis to support US EPA projects.
- Analytical precision will be documented with duplicate and replicate analyses.
- The laboratory must willing and able to provide technical assistance to START project management regarding analysis prior to and after generation of data.

2.3 TURNAROUND TIME

Sample data turnaround for PLM and TEM data is10 days from sample receipt. The report turnaround requirements for samples are specified in Table 2-2 Turnaround times for Data packages is also specified in Table 2-2.

2.4 ANALYTICAL PROTOCOL REQUIRED

Samples for PLM analysis are to be analyzed, documented, and reported as specified in the NIOSH 9002 and this SOW. Samples for TEM analysis are to be analyzed, documented, and reported as specified in the *EPA 600/R-93/116* method and this SOW. Any modifications to these protocols should be specified and approved prior to acceptance of project. Protocol, procedures and parameters not discussed in the method or specified in this SOW should be addressed in the laboratory Standard Operating Procedure (SOP) for PLM analysis NIOSH 9002 and by TEM analysis by *EPA 600/R-93/116.*

Table 2-1 Summary of Samples to be Collected		
Method:	NIOSH 9002, *Asbestos by Polarized Light Microscopy*	*EPA 600/R-93/116, Method for the Determination of Asbestos in Bulk Building Materials Method.*
Sample Container:	Prepared sample mass ranging from 5 to 10 grams.	
	Number of Samples	**Number of Samples**
	2 PE Samples	2 PE Samples

Table 2-2 **Analytical Requirements** **for El Dorado Hills Naturally Occurring Asbestos**		
Each samples will be dried, milled, sieved and packaged in a seal bag with custody documentation. **Sample collection dates: October 2004** **Sample delivery date: February 2005**		
Method	**Specification**	**Turnaround Times**
NIOSH 9002, *Asbestos by Polarized Light Microscopy*	-Detection Limit: 1 % -Screening level: 1 %	**Final Data Report:** **Samples:** Within 10 working days of receipt. **Data Package:** **All Samples:** Within 10 working days of final report.
EPA 600/R-93/116, Method for the Determination of Asbestos in Bulk Building Materials Method.	-Preparation and analysis of samples that have PLM concentration less than 1%. -Detection Limit: 0.0025% by weight -Aspect Ratio: All asbestos structures with an aspect ratio greater than or equal to 3:1 will be counted irrespective of length. -Identification of fibers.	**Final Data Report:** **Samples:** Within 10 working days of receipt. **Data Package:** **All Samples:** Within 10 working days of final report.

Table 2-3
For TEM Analysis only
Analytical Requirements per Each Sample
for El Dorado Hills Naturally Occurring Asbestos

Mineral Identification of Representative Structures

- Identification of asbestiforms shall include the following:

Regulated - tremolite, anthophyllite, actinolite, crocidolite, amosite and chrysotile
Other amphibole asbestiforms - winchite, richterite, ferro-edenite , magnesio-arfvedsonite, and magnesio-reibeckite
Non-Asbestos Material- all other mineralogy

Structure Classification for Each Structure

Dimensions for Each Structure

Counting

(All structures with aspect ratio of greater than or equal to 3:1)

Counted structure shall include the following:
Regulated - tremolite, anthophyllite, actinolite, crocidolite, amosite and chrysotile
Other amphibole asbestiforms - winchite, richterite, ferro-edenite , magnesio-arfvedsonite, and magnesio-reibeckite

Primary Structure Counts (Irrespective of Length).
Structures with Lengths Greater than 5 μm.
Fibers and Bundles with Lengths Greater than 5 μm.

Calculations

Counted structure shall include the following:
Regulated - tremolite, anthophyllite, actinolite, crocidolite, amosite and chrysotile
Other amphibole asbestiforms - winchite, richterite, ferro-edenite , magnesio-arfvedsonite, and magnesio-reibeckite

Asbestos Structures Per Square Millimeter
95 % Confidence Interval for Each Reported Concentration

Parameters

Analytical Sensitivity
Grids Opened
Area of Filter Analyzed
Total Filter Area

3.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

Method-specific quality assurance/quality control (QA/QC) requirements specified in the PLM and TEM methods are to be followed with the following specifications.

The following replicate and duplicate analyses are required for all samples analyzed by TEM:

Replicate Analysis:	New grids counted by same analyst:	% 5
Replicate Analysis:	New preparation by same analyst:	% 5
Duplicate Analysis:	Same grids recounted by different analyst:	% 5
Duplicate Analysis:	New grid counted by different analyst:	% 5
Duplicate Analysis:	New preparation by different analyst:	% 5

Other QA/QC requirements should include analysis of a laboratory control standard, process blanks and filter blank with each group of samples. A determination of a blind internal laboratory control sample by the analyst during the analysis phase of this project is recommended. However, if this is not practical, documentation of the primary analyst performance results from the most recent quarterly inter-laboratory performance verification may be substituted in lieu of a laboratory control sample. The quality assurance limits used to evaluate the QA/QC samples must be indicated with quality assurance data reporting.

The laboratory is expected to adhere to standard laboratory practices when analyzing samples and documenting results. Questions concerning specific sample analyses should be addressed prior to analysis of samples. If the laboratory has any questions or problems concerning the analysis of received samples, E & E should be notified immediately by phone, followed by a letter in hard copy that discusses the problem(s) and associated resolution(s). All correspondence between the laboratory and E & E should be documented in the data package. **If established QC limits are exceeded, appropriate actions must be taken to correct or address the problem. Re-analysis of the affected samples is required for all non-matrix related problems.**

4.0 DELIVERABLES REQUIREMENTS

Samples analyzed by the laboratory for this project will require the following deliverables:

- Final data report
- Complete data package

4.1 FINAL DATA REPORT

The final data report may be reported either in a summary table or on individual sample sheets. Reports must be signed and should either be hard copies sent by mail or image files sent by e-mail or mail. The data should be clearly identified as being final. All QC summary information must be included.

The following data is required in the final report for PLM analyses:

Narrative on conditions of sample, method, counting rule, and summary of any quality assurance or quality control problems encountered during analysis.

For each PLM sample and all PLM QC samples include client sample name, laboratory identification number, appearance, % fiberous non-asbestos, % non-fiberous non-asbestos, % chrysotile asbestos, % amphibole asbestos, analytical sensitivity, analyst, and analysis date.

The following data is required in the final report for TEM analyses:

For each TEM sample and all TEM QC samples, include client sample name, laboratory identification number, analytical sensitivity, grids opened, filter area, area analyzed, analyst, and analysis date.

For each regulated asbestiform include the following: primary structures in weight percent, primary structures > than 5 μm in length in weight percent, asbestos fiber and bundles > 5 μm in length in weight percent, 95 % confidence interval.

For each other amphibole asbestiforms include the following: primary structures in weight percent, primary structures > than 5 μm in length in weight percent, asbestos fiber and bundles > 5 μm in length in weight percent, 95 % confidence interval.

For each sample and all QC samples, include the TEM Asbestos Fiber Count-Raw data information table. This table should include for each grid, the grid number, grid coordinates, primary and total structures, lengths, width, structure type, and asbestos type.

4.2 COMPLETE PROJECT DATA PACKAGE

The final data package may be reported either as a compilation of printed data or as a compact disk-read only memory (CD-ROM) with image files that are a facsimile of the printed data package. The image file should be in portable document format (pdf).

The data package shall include all copies of the original documentation generated in support of a method performed under the contracted Statement of Work. The data packages will be used to demonstrate and document that all requirements of the method have been met. The data packages will be used to support US EPA decisions and cost recovery efforts. Data and data packages may be used to support US EPA civil enforcement activities. The documentation includes, but is not limited to, sample tags, custody records, shipping information, standard preparation records, sample preparation/extraction records, and sample analysis record including printouts and copies of log pages or copies of log sheets. The laboratory must maintain all original information and documentation required in the data package for five years. All related method records in permanently bound notebooks and all related computer files must also be maintained for five years. Otherwise, the laboratory must provide original documents and files in the data package rather than copies.

The following deliverables are required in the data package. The following data requirements are included to specify and emphasize general documentation requirements and are not intended to supercede or change the requirements of each method.

- Raw data (to support all summary data) should include the following:
  1. Copies of all analysis preparation sheets.
  2. Copies of all analyst count sheets.
  3 Copies of all information necessary to calculate data reported in the final data report.

- Pages within the final data report and data validation package will be numbered sequentially.

- A copy of the laboratory's certification for TEM analysis must be included with data validation package.

5.0 ADDITIONAL REQUIREMENTS

All samples and prepared materials related to the samples must be held for six months. Prior to disposal of any sample, E & E must be notified and may require that the samples be returned to E & E, at E & E cost.

Disposal of samples and sample containers must be in compliance with local, state, and federal regulations and will be the responsibility of the laboratory. **Disposal cost must be included in the price of analysis.**

The data package will be independently validated within two months of package receipt. The laboratory will likely be contacted during the validation process to clarify any discrepancies or problems. The laboratory will perform corrective action as required. **All post sampling costs related to validation and corrective actions must be included in the price of analysis.**

All hard and electronic data generated in relation to E & E projects must be archived for five years.

Audits may be performed by E & E or the US EPA Quality Assurance Office. Performance Evaluation samples may be submitted to the laboratory at any time.

All work must be performed by the contract specified laboratories.

Howard Edwards
Ecology and Environment, Inc.
350 Sansome, Suite 300
San Francisco, CA 94104
(415) 981-2811
(415) 981-0801 FAX
Hedwards@ene.com

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

FACSIMILE

Mark Bailey
Laboratory Director
Asbestos TEM Laboratory
Berkeley, California

Dear Mr. Bailey:

I am writing to provide formal notification of results of two recent asbestos containing performance evaluation (PE) samples analyzed by PLM and TEM by Asbestos TEM Laboratory, and reported on March 9, 2005. The PE samples contained Chrysotile, and Tremolite in soil at approximately 0.5% in one PE and approximately 2% in the second PE.

Asbestos TEM performed well on the analyses. The fibers were correctly identified. There is some consistent overestimation, however, the results are considered to be within an acceptable range.

Please contact me 415-972-3802 if you have any questions.

Sincerely,

Stephen E. Remaley
Chemist/Regional Contract Lab Program Project Officer
415-972-3802

OPTIONAL FORM 99 (7-90)
FAX TRANSMITTAL # of pages ▶

To Lisa Johnson	From Remaley
Dept./Agency R4	Phone # 415-972-3802
Fax #	Fax #

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

Preparation of Soil Samples Quantitatively Mixed with Tremolite and Chrysotile Asbestos

Equipment and Materials

- NIST SRM Tremolite Asbestos
- NIST SRM Chrysotile Asbestos
- Local soil from Chatham County, NC
- Multi-speed blender
- Stirring utensils
- Metal drying pans
- Ultraviolet drying lamps
- Hot plate

Two batches of asbestos in soil were created; one batch contained 0.5% each of chrysotile and tremolite, and the other contained 2% each of chrysotile and tremolite. A total of one hundred grams was the target weight for each of the two sample batches. For the sample concentration of 0.5%, 99 grams of dried soil was weighed, and 0.5 grams of each asbestos SRM was weighed for mixing. In the case of the 2.0% concentration sample, 96.0 grams of dried soil was used and 2.0 grams each of the two asbestos types were weighed for mixing.

Once all components were weighed, 8 oz. of distilled water was poured into the blender jar and the two asbestos types were mixed on the highest setting for 30 seconds, the soil was then added and the components were blended together for another 45 seconds for the 0.5% concentration and another 60 seconds of blending for the 2.0% sample. Each of these wet mixtures was then poured into a drying pan and labeled as to their asbestos concentration and dried under heat lamps and on hot plates until completely dry.

The materials were then packaged into plastic vials and labeled according to their concentration. Aliquots from each vial were used to make quantitation slides for visual estimates and for point count slides. The results of quantitation are shown below.

Quantitation of Asbestos/Soil Mixtures		
Concentration	Visual Estimate Result	Point Count Result
0.5% Chrysotile + 0.5% Tremolite	0.47% Chrysotile 0.59% Tremolite	1.4% Chrysotile 1.2% Tremolite
2% Chrysotile + 2% Tremolite	1.85% Chrysotile 2.92% Tremolite	4.7% Chrysotile 3.9% Tremolite

Thickness differences between the soil matrix particles and the asbestos bundles are speculated to have caused the biased high results on the point counts.

Production date: October 6, 2004
Produced for: Steve Remaly, Region 9 USEPA, telephone 415-972-3802, email Remaley.Steve@epamail.epa.gov
Produced by: Owen Crankshaw, RTI International, P.O. Box 12194, Research Triangle Park, NC, 27709, telephone 919-541-7470, email osc@rti.org